Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/MCA/SEM-4/MCA-403/2012

2012

DATABASE MANAGEMENT SYSTEM-II

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) Suppose R is a relation of n attributes $\{A1, A2, \ldots. An\}$, How many superkeys are possible if $\{A1, A2\}$ is primary key ?

   a) $2 * n$ b) $2 * (n - 2)$

   c) 2^{n-2} d) 2^{n-1}.

   ii) A query with multiple selection conditions that are connected via OR may not be prompting the query optimizer to use any index. Such a query can be split up and expressed as ..... of queries, each with a condition on an attribute that causes an index to be used.

   a) Intersection b) Union

   c) Division d) Minus.

iii) Which of the following is an optimistic concurrency control scheme ?

a) Lock based

b) Time stamp ordering

c) Validation based

d) All of these.

iv) Which of the following ensures that the system will never enter deadlock ?

a) Deadlock detection protocol

b) Timestamp ordering protocol

c) Two-phase locking protocol

d) none of these .

v) Explicit cursor

a) is a temporary named memory location

b) consist of active data set

c) could process one record at a time

d) all of these.

vi) Given $FD : \{ A \rightarrow B, B \rightarrow D, C \rightarrow D \}$ of the relation $R = (A, B, C, D)$. Candidate key will be

a) A b) B

c) AB d) None of these.

vii) A serializability order of the transaction can be obtained through

a) Quick sort b) Topological sort

c) Selection sort d) Merge sort.

viii) Timestamp has a property of

a) Monotonicity b) Atomicity

c) Irreducibility d) None of these.

ix) The first phase of query processing is

a) Decomposition b) Restructuring

c) Analysis d) None of these.

x) Group of procedures, functions, variables, constants, cursors, exceptions, and SQL statements are put in a single unit called as

a) Class b) Package

c) PL/SQL d) None of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Consider the following schedule of 5 transactions :

T1	T2	T3	T4	T5
Read (X)		Read (Z)	Read (U)	Write (V)
Read (Y)			Write (Z)	Write (R)
Write (Y)				
	Read (X)		Write (U)	
	Read (Y)			
	Write (X)			
	Read (Z)			
		Write (U)		
		Write (Z)		
	Write (Z)			
			Write (Y)	
		Read (U)		
				Write (V)
Write (Z)				

Test the following schedule whether it is serializable or not.

3. How does recovery manager implement shadow-database schema for transaction execution ?

4. a) What are stored procedures ? Briefly discuss the different parts of stored procedure.

   b) What are sequences ? 1 + 3 + 1

5. Differentiate between Wait-die and Wound-wait schemes.

6. Show that 2PL protocol ensures conflict serializability and that transactions can be serialized according to their lock points.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Define transaction in respect of DBMS. What is scheduling ? What is conflict equivalent serializability ? Define precedence graph and discus its utility in serializability testing algorithm for scheduling.

2 + 2 + 2 + 4

b) What is system log ? Describe its utility. 5

8. a) Define multivalued functional dependency. 2

b) Define lossless join decomposition with suitable example. 4

c) Give an example of a relation such that it is in 3NF but not in BCNF. Justify. 6

d) What is temporary update problem ? 3

9. a) Define and differentiate LOG and CHECKPOINT. 2 + 2

b) Explain dirty read problem with one example. 3

c) Define transaction-consistent checkpoint, Action-consistent checkpoint. 1 + 1

d) What is Phantom deadlock ? 2

e) Write the functionalities of OPEN, FETCH and CLOSE commands. 4

10. a) What is granularity of locking ? State Tree Protocol.

b) What do you understand by dependency preservation ?

c) Consider the following relation :

CAR_SALE (Car#, Date_sold, Salesman#, Commission%, Discount_amt). Assume that a car may be sold by multiple salesmen and hence {CAR#, SALESHMAN#} is the primary key.

Additional dependencies are :

Date_sold-> Discount_amt

and

Salesman#-> Commission%

Based on the given primary key, is this relation in 1NF, 2NF, or 3NF ? Why or why not ? How would you successively normalize it completely ? (2 + 2) + 3 + 8

11. a) State and explain any three problems of concurrency control.

    b) Explain Data Fragmentation.

    c) Write the advantages and disadvantages of Object Oriented Database management system. 6 + 4 + 5

12. Write short notes any *three* of the following : 3 × 5

    a) Embedded SQL

    b) Join dependency

    c) Conflict and view serializability

    d) Tree protocol

    e) Tree protocol

    f) Deadlock prevention and avoidance.